N. GOODYEAR.

GAS GENERATOR.

APPLICATION FILED DEC. 17, 1906.

930,749.

Patented Aug. 10, 1909.

2 SHEETS—SHEET 1.

Fig. 2.

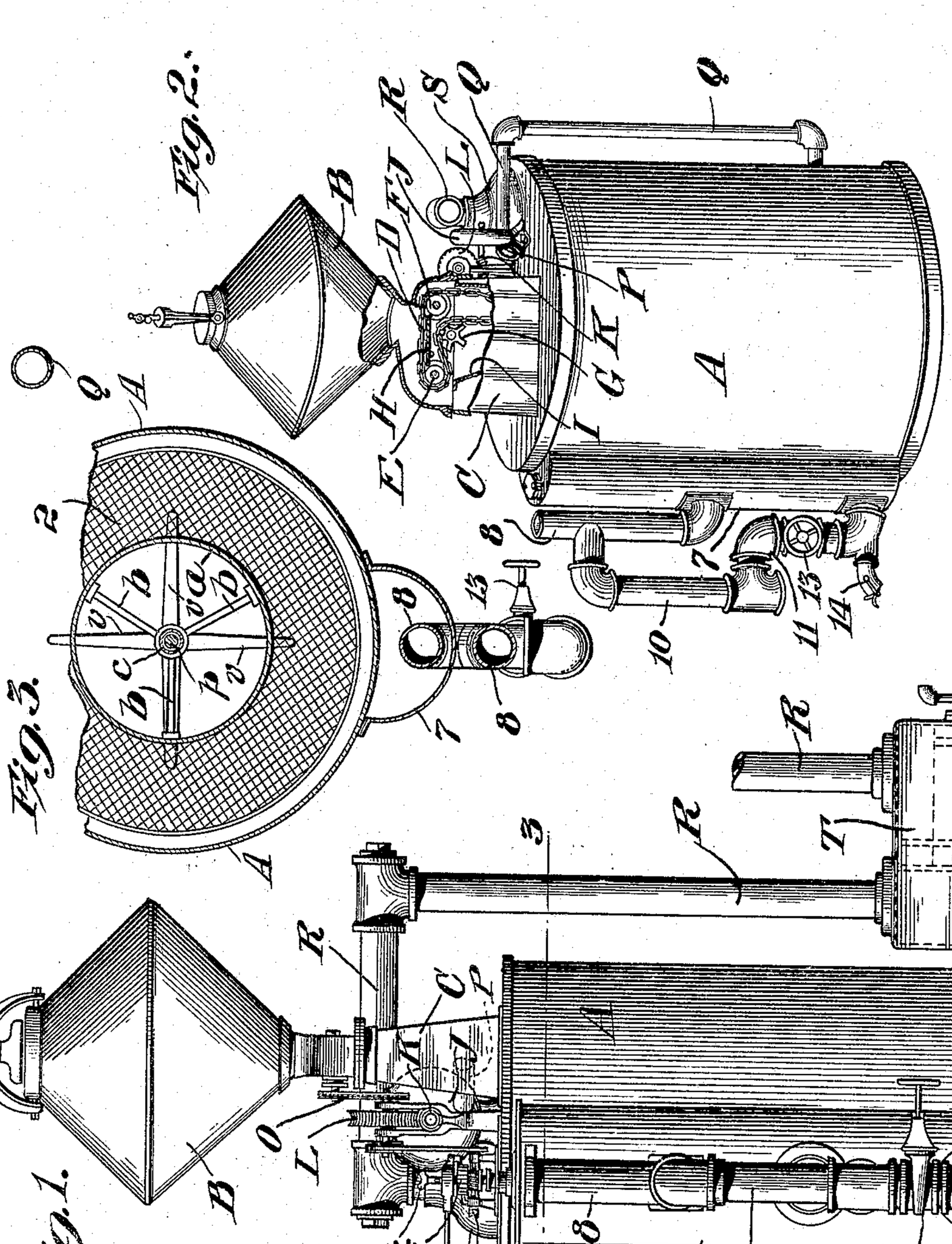

Fig. 3.

Fig. 1.

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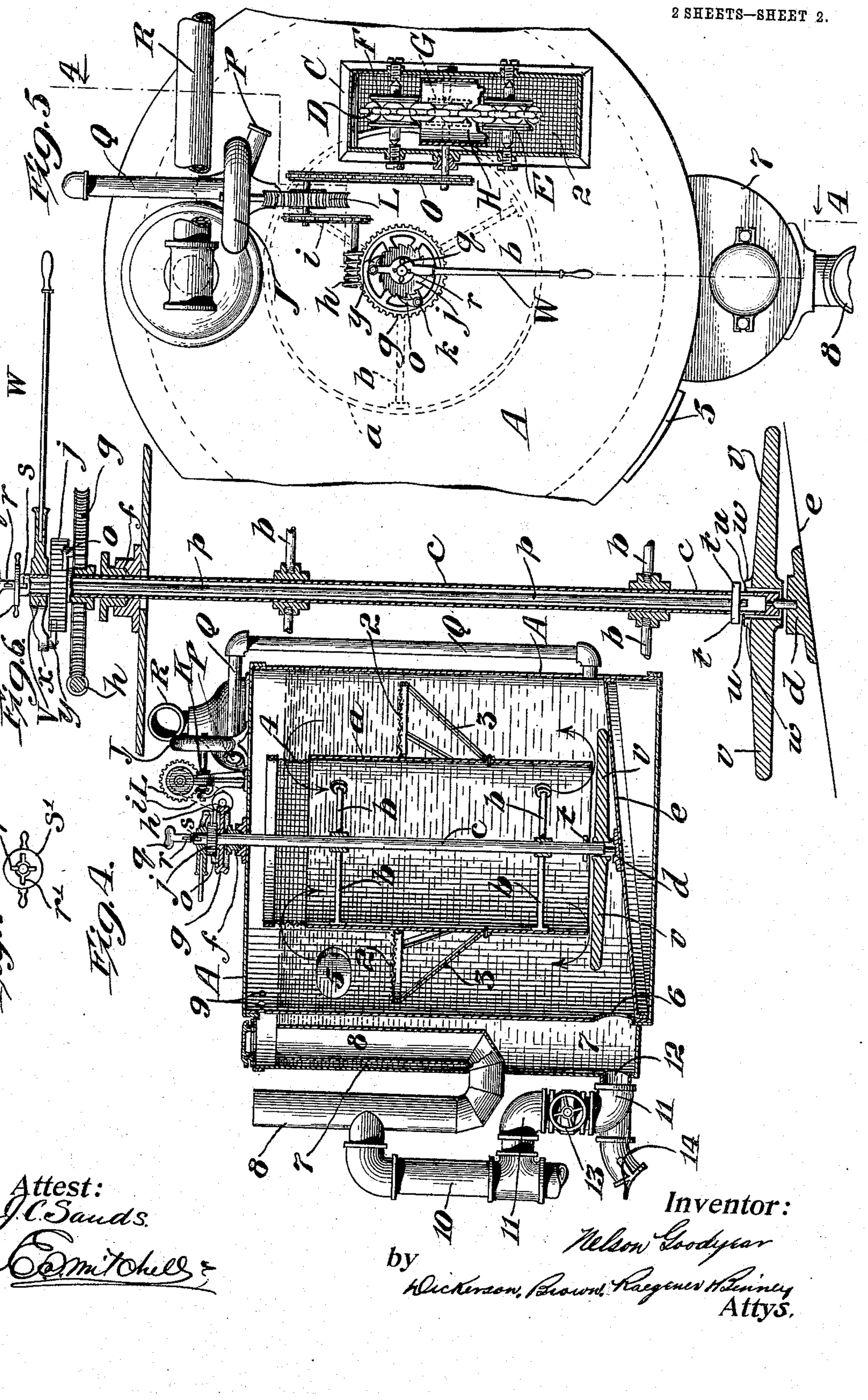

UNITED STATES PATENT OFFICE.

NELSON GOODYEAR, OF NEW YORK, N. Y., ASSIGNOR TO J. B. COLT COMPANY, A CORPORATION OF NEW JERSEY.

GAS-GENERATOR.

No. 930,749. Specification of Letters Patent. Patented Aug. 10, 1909.

Application filed December 17, 1906. Serial No. 348,108.

To all whom it may concern:

Be it known that I, NELSON GOODYEAR, a citizen of the United States, and resident of the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Gas-Generators, of which the following is a specification, accompanied by drawings.

This invention relates to gas generators, more particularly to generators of the type in which the solid gas generating material is fed to the liquid, and the objects of the invention are generally to improve upon the construction and operation of such machines.

Another object of the invention is to prevent the accumulation of the gas generating material at any one place in a generator tank.

Further objects of the invention are to improve the circulation in the tank, and thereby facilitate the removal of the residuum.

Further objects of the invention will hereinafter appear and to these ends the invention consists of a gas generator for carrying out the above objects embodying the features of construction, combinations of elements, and arrangement of parts having the general mode of operation substantially as hereinafter fully described and claimed in this specification and shown in the accompanying drawings, in which,—

Figure 1 is a front elevation of apparatus embodying the invention; Fig. 2 is a perspective side elevation of the apparatus; Fig. 3 is a horizontal sectional view on the line 3—3 of Fig. 1; Fig. 4 is a vertical sectional side elevation on the broken line 4—4 of Fig. 5; Fig. 5 is a partial top plan view of the apparatus; Fig. 6 is an enlarged detail vertical sectional view taken through the central shaft of the apparatus; Fig. 7 is a detail top plan view of a portion of Fig. 6.

Referring to the drawings, A represents the generator tank and B is the hopper carried upon the neck C supported from the top of the tank A. Suitable means are provided for feeding the gas generating material, as for instance the endless conveyer in the form of a linked chain D carried by the rollers E and F, and driven by the sprocket wheel G from a suitable source of power. Underneath the upper side of the chain is a trough or plate H, while the shield I extends downwardly underneath the chain.

In this instance a suitable hydraulic motor in the form of an impulse wheel within the casing J is connected to operate the chain D as by means of the worm K, wheel L and sprocket chain O. The intake for the impulse motor is represented at P, while Q represents the outlet pipe for the tail water, shown in this instance as communicating with the lower portion of the generator tank A, thereby supplying the tail water to the generator tank. The gas outlet pipe R communicates with the upper portion of the generator tank by means of the dome S, and leads to a suitable hydraulic seal T, from whence the gas is supplied for use.

Within the generator tank A is provided a vertical partition *a*, preferably cylindrical and supported as by means of the arms *b* from the central tubular shaft or sleeve *c*, the lower end of which is supported in a step bearing *d* on the slanting bottom *e* of the tank, the upper end extending through a stuffing box *f*, and being provided with a worm wheel *g* loose thereon, meshing with a worm *h* adapted to be driven by the sprocket chain *i* connected to be operated from the worm wheel L operated by the impulse wheel in the casing J. Above the worm wheel *g* is provided a ratchet wheel *j* fast to the tubular shaft and pivoted on the worm wheel *g* and *k* is a pawl *o* adapted to engage the teeth of the ratchet wheel *j*, and thereby impart rotation from the worm wheel *g* through the ratchet wheel to the shaft *c*.

Extending through the tubular shaft *c* is a rod *p* provided at its upper end with a handle *q* for raising and lowering the rod. Adjacent the handle *q* are the lugs *r* adapted to be seated in the slots *s* in the upper end of the tubular shaft *c*. Between the lugs *r* and the top of the tubular shaft is arranged a loose collar *s'* having slots *r'*, through which the lugs *r* may be lowered when the slots and the collar are rotated to register with said lugs *r*. When the shaft *p* is raised the collar *s'* may be rotated to bring the slots *r'* out of register with the lugs *r*, as shown in Fig. 7, thereby supporting the shaft in its raised position and maintaining the lugs *t* at the lower end of the shaft *p* out of engagement with the stirrer blades *v*. Transversely extending lugs or pins *t* are connected to the lower end of the rod *p* and extend through slots *u* in the lower end of

the tubular shaft *c*. Loosely mounted upon the lower end of the shaft *c* are the stirrer blades *v* provided with slots in the collar *w*, into which the lugs *t* are adapted to be seated when the rod *p* is lowered by means of the handle *q*, thereby connecting the rod *p* to rotate with the shaft *c* and imparting the rotation to the stirrer blades *v*.

Loosely mounted upon the upper end of the tubular shaft *c* above the ratchet wheel *j* is a collar V provided with a hand operating lever W and an arm *x*, provided with a pawl *y* adapted to engage the teeth of the ratchet wheel *j* so that by reciprocating the hand operating lever W the ratchet wheel *j* may be rotated, thereby rotating the shaft *c* and vertical partition *a* by hand when desired. At the same time if desired rotation may be manually imparted to the stirrer blades *v*.

An annular screen 2 is suitably supported around the outside of the vertical partition *a* in any suitable manner as by means of the arms or struts 3, and preferably the top of the partition *a* is adapted to be below the normal level of the water in the tank. A cylindrical screen 4 is shown arranged extending above the top of the partition *a* and reaching above the normal water level.

It will be observed that the neck C of the feeding hopper B is located at one side of the top of the tank so that the gas generating material is fed on to the screen 2 at one side of the partition *a*. The continuous rotation of the partition *a* and screen 2 during the feeding prevents the material from accumulating in any one place on the screen and insures the distribution of the gas generating material over a considerable area in the tank, thus inducing a circulation from all sides of the partition *a* upwardly over the top of the partition through the screen 4 and downwardly within the partition *a* as indicated by the arrows in Fig. 4.

5 represents a hand hole on the side of the tank A for cleaning purposes, and an aperture 6 is provided in the lower portion of the side of the tank communicating with an outer chamber 7, in which the residuum overflow pipe 8 is provided. Vents 9 are provided in the walls of the tank A above the normal water level between the gas generating chamber and the chamber 7, so that the water will stand at the same level in each chamber. As shown, the residuum overflow pipe 8 is in the form of a U, and the water level extends substantially to the upper edge of the pipe in the chamber 7. The outer leg of the U-shaped pipe 8 extends outside of the chamber 7 and is provided with the downtake pipe 10, which is also provided with a branch 11 communicating with the lower end of the chamber 7 at the aperture 12, and also provided with a valve 13 to enable the heavy residuum which collects on the bottom of the tank to be drawn off at intervals. A pipe 11 is also provided with a sludge cock 14.

The revolving screen or support within the tank A acts as a conveyer to convey the gas generating material away from the point at which it is deposited within the tank. The object in doing this is to prevent the accumulation of material at any one place, which would interfere with the relatively slow reaction, because the material would pile up faster than it could be reacted upon. When the material is allowed to pile up the particles in the interior of the pile are covered in and the liquid is prevented from reaching them, thereby interfering with the completeness of the reaction. With the ordinary materials for generating gas the material is all used up by the time that the point on the screen upon which the material has been dropped has made a complete revolution and again arrived at the place at which the material is falling through the water from the hopper. The screen therefore acts as a conveyer to convey the material away from the point at which it was first received.

An endless traveling submerged conveyer of any suitable type, as for instance slats connected to sprocket chains, may be arranged in the generator tank on suitable rollers and this endless conveyer may be connected to be driven in any suitable manner from the impulse wheel in the casing J. The endless conveyer should be so arranged that the material falls upon one end of the same and is continuously carried through the liquid in the tank and deposited at a point remote from the point at which it is received.

Obviously some features of this invention may be used without others and the invention may be embodied in widely varying forms.

Therefore, without limiting the invention to the devices shown and described, and without enumerating equivalents, I claim and desire to obtain by Letters Patent the following:—

1. In a gas generator in which gas generating material is fed to the liquid at a given point in the tank, the combination of a generator tank, means within the tank for carrying the gas generating material away from the point at which it falls, and means for inducing a circulation within the tank upwardly at the sides and downwardly at the center.

2. In a gas generator in which gas generating material is fed to the liquid at a given point at one side of the center of the tank, the combination of a generator tank, mechanical means within the tank for carrying the gas generating material away from the point at which it falls, and means for inducing a circulation within the tank upwardly at the sides and downwardly at the center.

3. In a gas generator in which gas generat-

ing material is always fed to the liquid at substantially the same point in the tank, the combination of a generator tank, submerged means within the tank for carrying the gas generating material away from the point at which it falls, and means for inducing a circulation within the tank upwardly at the sides and downwardly at the center.

4. In a gas generator in which gas generating material is always fed to the liquid at one side of the center of the tank, the combination of a generator tank, submerged mechanical means within the tank for carrying the gas generating material away from the point at which it falls, and means for inducing a circulation within the tank upwardly at the sides and downwardly at the center.

5. In a gas generator in which gas generating material is fed to the liquid at substantially the same point at one side of the center of the tank, the combination of a generator tank, a conveyer within the tank for carrying the gas generating material away from the point at which it falls, and means for inducing a circulation within the tank upwardly at the sides and downwardly at the center.

6. In a gas generator in which gas generating material is fed to the liquid at one place in the area of the tank, the combination of a generator tank a submerged conveyer within the tank, for carrying the gas generating material away from the point at which it falls, and means for inducing a circulation within the tank upwardly at the sides and downwardly at the center.

7. In a gas generator in which gas generating material is fed to the liquid at a given point in the tank at one side of the center, the combination with a generator tank, of motor driven feeding means, submerged means driven thereby for carrying the material away from the point at which it falls, and means for inducing a circulation within the tank upwardly at the sides and downwardly at the center.

8. In a gas generator in which gas generating material is fed to the liquid at a given point in the tank at one side of the center, the combination of a generator tank, feeding means, a submerged conveyer within the tank, a motor connected to operate said feeding means and said conveyer, and means for inducing a circulation within the tank upwardly at the sides and downwardly at the center.

9. In a gas generator in which gas generating material is fed to the liquid, the combination of a generator tank, a tubular vertical partition therein, an annular screen carried thereby, and means for rotating said partition and screen.

10. In a gas generator in which gas generating material is fed to the liquid, the combination of a generator tank, a tubular partition within the same, an annular screen carried on the outside of said partition, feeding means and a motor connected to operate said feeding means, and connected to rotate said tubular partition and screen.

11. In a gas generator in which gas generating material is fed to the liquid at one side of the center of the tank, the combination of a generator tank, a horizontal screen arranged within said tank, a motor for rotating said screen, and means for inducing a circulation within the tank upwardly at the sides and downwardly at the center.

12. In a gas generator in which gas generating material is fed to the liquid at one side of the center of the tank, the combination of a generator tank, a horizontal submerged screen in said tank, a motor for rotating said screen, and means for inducing a circulation within the tank upwardly at the sides and downwardly at the center.

13. In a gas generator in which gas generating material is fed to the liquid, the combination of a generator tank, a vertical shaft, a tubular partition carried thereby, a horizontal screen carried outside of said partition, and a motor connected to rotate said shaft.

14. In a gas generator in which gas generating material is fed to the liquid, the combination of a generator tank, a vertical shaft, a tubular partition carried thereby, a horizontal screen carried outside of said partition, a motor connected to rotate said shaft, and additional manual means for rotating said shaft.

15. In a gas generator in which gas generating material is fed to the liquid, the combination of a generator tank, a vertical shaft, a tubular partition carried thereby, a horizontal screen carried outside of said partition, a motor connected to rotate said shaft, stirrer blades in the tank, and means for driving said blades from the motor.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

NELSON GOODYEAR.

Witnesses:
A. K. SCHNEIDER,
OLIN A. FOSTER.